WASTE MANAGEMENT ISSUES IN BRITISH COLUMBIA

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October 1990

Prepared For The British Columbia Round Table
On The Environment And The Economy

ROUND TABLE

PREFACE

"Waste Management Issues In British Columbia" was prepared by Dr. A.N. Boydell at the request of the British Columbia Round Table on the Environment and the Economy. It is part of a series of background reports dealing with issues which Round Table committees considered important to the development of a sustainable development strategy in British Columbia. It is intended to provide information that will assist the dialogue between the Round Table and the public.

The Round Table has not endorsed the report. The information provided and conclusions reached in this document are those of the author.

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On the Environment And The Economy

EXECUTIVE SUMMARY

Waste Management Issues In British Columbia

This background report focuses on an overview of solid and liquid waste management issues in British Columbia.

The author indicates that the majority of Municipalities and Regional Districts do not have waste management plans in place, that there should be more focus on goals for managing liquid wastes, that environmental standards must be updated, and that a regulation process needs to be developed based on the ability of the ecosystem to assimilate waste discharges from any sources.

Other issues addressed in the report include: how to pay for waste management, composting organic wastes, dealing with the quality and quantity of packaging materials, defining and dealing with "problem" wastes, developing a framework for toxic wastes, and a "3-R" policy for liquid wastes.

1. INTRODUCTION

Waste Management issues in an Urban Settlement context are no more than regional sub-sets of a worsening global condition. The creation and acceptance of a sustainable development ethic is a necessary pre-requisite to meeting waste generation challenges in British Columbia.

1.1 The Global Context

"Humankind is now dominant in effecting perhaps irreversible change on the Earth's surface, and I suggest that we do not know enough to decide how to run this planet. We are forcing our will upon it, using ever-depleting resources and increasing waste discharge, while at the same time claiming that we must aim for "sustainable development", which has been defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (McLaren, 1990).

1.2 The Canadian Context

"Every Canadian produces three kilograms of waste per day - Canada leads the world! Even in less-developed countries, people produce one kilogram per day...We only have temporary solutions for dealing with waste - what to do with the mountains of garbage we produce except bury it?" (Fyfe, 1990).

1.3 British Columbia

"Garbage is an emerging problem in British Columbia. Most of our garbage is disposed of at landfills. Over 60 percent of the landfills will be full within 10 years. Environmental and public concerns, along with conflicts with other land uses, make replacement landfills difficult to establish. Most of the material and energy in garbage can be reused, so we are wasting resources at a rate of over two kilograms [per person] per day. Our approach [should be] to recycle the resources and energy in solid waste, and to reduce the production of material which can become waste" (Rabbitt, 1989).

1.4 Sustainable Development and Waste Management

The concept of Sustainable Development, in the context of urban settlement, requires definition. There is agreement, however, that it should include maintaining a naturally

productive land base, clean air and water, biological diversity, and the avoidance of irreversible environmental effects on our ecosystems.

"Limits to [sustainable] development are not absolute but are imposed by present states of technology and social organization and by their impacts upon environmental resources and upon the biosphere's ability to absorb the effect of human activities" (WECD, 1987).

In an initial response to the challenges implicit in sustainable development, the Government of British Columbia has adopted the five R's of municipal solid waste management:

Reduce by promoting the use of products and packages that create less waste;

Re-use by promoting containers, such as beverage bottles, that can be used again;

Recycle by separating useful materials from waste materials before collection;

Recover by extracting useful materials and energy from waste after collection;

Residue management, by disposing of final waste materials in an environmentally safe way.

1.5 Municipal Solid Waste Management Strategy

The provincial Ministry of Environment announced recently a five-year Municipal Solid Waste Management Strategy aimed at cutting in half by the year 2000 the amount of solid wastes produced by British Columbians and at developing environmentally responsible ways of disposing of solid wastes that cannot be reduced, reused, recycled or recovered. This strategy, based on the 5 R's, recognizes that the limits to sustainable development will be determined according to local, rather than provincial, circumstances and that the issues surrounding the environment and the economy are essentially community issues demanding community mobilization, support and implementation.

2. PURPOSE

The purpose of this paper is to provide an overview of waste management issues and initiatives in British Columbia, in the context of human settlement and in so doing, to draw on examples from other jurisdictions and to examine some alternative methods for municipal waste disposal. This paper is intended to serve as a basis for discussion in the public consultation process.

3. BACKGROUND (SOLID/LIQUID WASTES)

The traditional approach to waste management in Canada has been one of statutory control of allowable point source discharges to air, land and water, with responsibilities divided between the federal government and the province. Recent planning initiatives and the shift of management responsibilities to local governments have created the opportunity for innovative partnerships, from the grass roots recyclers to the federal government.

3.1 The Legal Framework

Waste Management in Canada, from a statutory point of view, has been based broadly on the constitutional division of powers contained in the British North America Act. In general, the Federal Government has exercised its powers in the areas of Navigation and Shipping, and the Sea Coast and Inland Fisheries, as they relate to the purity of water and the protection of fish.

Of note is the Fisheries Act, for the protection of fish and water quality, the Pleasure Craft Sewage Pollution Prevention Regulations under the Canada Shipping Act, and the Canadian Environmental Protection Act, which includes powers over air emissions, ocean dumping, management of toxic substances, waste discharges on federal lands, and the establishment of environmental quality objectives.

The provinces, with exclusive powers in the areas of Local Works and Undertakings, Property (including resources), and Matters of a Local Nature, have focused on comprehensive environmental protection statutes which were first enacted in the 1960's.

In British Columbia, the Pollution Control Act (1967) was the primary instrument for the control of waste discharges, allocating wide powers to the Director to determine a polluted state, to prescribe standards for discharges to land, air and water, and to approve plans for discharge works. Standards, such as the Pollution Control Objectives for Municipal Type Discharges (1975) were developed through a limited public process and permits to discharge were issued based on the tailoring of standards to accommodate local conditions.

In 1982, the Pollution Control Act was replaced by the Waste Management Act. Although the new Act did retain some of the features of the Pollution Control Act, it departed significantly from it by introducing the concept of a Waste Management Plan (Part 3, ss. 16, and amendments to ss. 16.1, 1989). Regional Districts, as well as Municipalities not within Regional Districts, were required to submit waste management plans by December 31, 1995, and submit biomedical waste plans by December 31, 1992. The result was the creation not only of an opportunity to switch from reactive to proactive waste management but also of a new role for the Waste Management Branch as partners with local government in the planning process.

Two other pieces of provincial legislation have a particular statutory interest in waste management: The Municipal Act; and, the Water Act. Divisions (4) and (5) of the Municipal Act assign "public works" responsibilities to local government in the management of sewerage, storm drain discharges, and solid waste disposal. Section 41 (k) of the Water Act (Offenses) lists substances that are prohibited from being discharged to a stream.

The net effect of the provincial legislation has been to allocate much of the responsibility for waste management to the local government level. The provincial government sees itself primarily in a leadership role, providing the regulatory framework, establishing strategic goals, providing financial support for various waste management initiatives (as a catalyst, for example, in market development for recyclables), and providing information.

3.2 Current Activities

Federal waste management activities are carried out almost exclusively by Environment Canada. The majority have to do with areas of specific federal responsibility or interest

such as advising on waste facilities infrastructure for native bands or monitoring waste discharges that affect fish.

International responsibilities of the federal government include control of discharges to Boundary Waters and upholding the bilateral International Shellfish Agreement to ensure safety of shellfish growing areas. This is often an area of conflict with the Province where municipal discharges generally exceed shellfish harvesting standards for water quality.

Environment Canada, in cooperation with the Province, provides grants to community groups for environmental improvements, and although this covers all aspects of the environment, most of the $2-3 million allocated to British Columbia and the Yukon, this year, has gone to recycling projects.

Currently under consideration are a series of new initiatives in which the federal government has agreed to develop programs of incentives and disincentives to recycling and resource recovery.

Provincial waste management activities have been focused almost exclusively on the Municipal Solid and Biomedical Waste Program. As noted elsewhere, this initiative is the outcome of earlier amendments to the Waste Management Act and to the issuance of the Municipal Solid Waste Planning Guidelines in June 1990.

In addition to the Solid Waste Planning Process, provincial activities include: Beverage Container and Pesticide Container Recovery Strategy; Lead-Acid and Non-Lead Acid Battery Recovery initiatives; opportunities for recycling Plastics, Waste Oils, Scrap Tires; establishment of a Waste Paper Deinking facility; demonstration projects in Resource Recovery; Recycling Hotline through the Recycling Council; Biomedical Waste disposal; establishment of a proposed Litter Advisory Council and a Partners in Recycling Fund; the development of a comprehensive education and information program, including a project with Science World and a province-wide Ministry Mall tour; development of an environmental industries strategy; and, new legislative initiatives to support solid waste planning.

Local government is now faced with the challenges of waste management planning in an increasingly more formalized context. While a number of Municipalities and some Regional Districts have either solid or liquid waste plans in place, the majority have not. Appendix A is a summary of the status of waste management planning in British Columbia for both solid and liquid wastes.

The Recycling Industry in British Columbia is complex and diverse, with about 80 organizations consisting both of industry and non profit groups generating about $35 million in annual sales and employing about 1,000 people. Only five firms manufacture recyclable materials, the remainder are collectors and primary processors. As a result, a significant portion of recyclable materials is exported after primary processing.

The Recycling Council of British Columbia operates a **Waste Materials Exchange** in which wastes are advertised, together with a **Recycler's Directory**, on an irregular basis, depending on the availability of funds. The Recycling Council also runs the recently introduced **Provincial Recycling Hotline** through which the public can access information on recyclable materials, contacts for local and regional programs, and recycling organizations in British Columbia.

4. THE ISSUES

Waste management issues exist because we have not yet been able to establish commonly accepted goals for long term environmental sustainability. We have neither a consensus as to how to achieve such goals nor a willingness to change our value systems and practices. There is a set of basic waste management issues and the specific issues of solid or liquid waste are simply sub-sets of these. It should be noted that air management is the subject of a separate background paper.

4.1 The Basic Issues.

4.1.1 Our Lifestyle. We cannot afford, in an environmental, social or economic sense, to maintain a lifestyle which creates so much waste, which is based largely on "throw-away" principles, and which is so oriented to "convenience" (e.g. prolific use of packaging). Landfills, if they are not already full, are offensive and expensive; nearshore waters are

contaminated with chemicals; shellfish harvesting is banned over more than 70,000 hectares; packaging to sell product is the norm in the retail industry.

It has become clear that we have to change our value systems, our social attitudes and practices. The question is, how?

Four instruments of change at our disposal are:

Education
Legislation
Economic Incentives
Economic Disincentives

The role of education is to deliver knowledge about the generation of wastes and ecological impacts, to foster a sense of accountability, and to lay out some practical solutions for change. The approach will vary according to the target audience but a strong emphasis should be placed on the school system. Environment must become a part of the curriculum. The goal must be to instil value systems and voluntary practices which are in harmony with ecological requirements. Children will educate their parents.

Education should lead to enhanced "consumer power" Changing product preferences and buying patterns of consumers will exert significant influence in the market place as the less "desirable" products remain on the shelves.

Education should be supported by legislation. In British Columbia, it has been, and still is, common practice for government to manage the process of issuing waste management permits through the use of guidelines rather than explicit regulations. Guidelines have no direct force of law but are supported generally by statute. Assuming that we need to act quickly and effectively to deal with our waste problems, should we be demanding that everyone toe the line through more regulations and less discretionary guidelines?

In general, we can use money either as an incentive to achieve certain objectives, or as a disincentive. Is one way more desirable than another or should we use a combination of both?

It might be argued that the use of incentives seems better suited to relatively large-scale "structural" adjustments such as attracting new environmental industry through various subsidies, or providing large government grants to support waste management initiatives. Disincentives, including those of a statutory offence nature, are seen to be more instruments of avoidance or inconvenience and seem better suited as mechanisms for altering social and behavioural preferences.

It might also be argued that the use of incentive mechanisms, by virtue of their positive aspects, would be the more attractive choice. The disincentive instruments for social change cannot be ignored, however, if we are to avoid an already deepening crisis.

In summary, it is not likely that the four mechanisms will be viewed as alternative choices but rather that an appropriate blend of all four must be sought.

4.1.2 Single Source Waste Discharges. The common approach to regulating or permitting a discharge has been to approve each one as a discrete case. As a consequence, there has been no means to assess the combined or cumulative impact of all discharges on a particular local environment (ecosystem). Thus, we do not know whether or not we are creating harmful ecosystem effects. The Ministry of Environment is, in a number of cases, attempting to assess the cumulative impact of discharges on a local environment. In addition, they are developing ambient air and water quality objectives for all key parameters, as well as specific objectives for particular airsheds and watersheds. Should we not, however, be determining what the assimilative capacity of each ecosystem is and then devising a process of regulation and monitoring to ensure that it is never exceeded?

To proceed in this direction, however, it will be necessary for the provincial government to develop the capability to develop an ecosystem database together with the creation of appropriate methodologies for interpretation, synthesis and application.

4.1.3 What Is Our Overall Goal for Managing Waste? There is no overall goal or set of principles for dealing with wastes. There is a goal for solid waste which has been established by the provincial government through the Municipal Solid Waste (MSW) Planning Guidelines. It is a reduction goal, based on reducing the per capita discharge from 2.2 kg/capita/day to 1.1 kg/capita/day by the year 2000, with an interim level of 30 percent targeted by 1995. These goals have been established for the provincial waste stream as a whole.

In the Lower Mainland, it is hoped to achieve approximately an 80 - 85 percent reduction using resource recovery after the 50 percent reduction has been achieved through recycling and composting.

At the regional level, it is considered to be more important to foster the attitude that solid waste should be reduced to the greatest possible extent, consistent with community resources and the nature of the regional solid waste stream.

It is not clear, however, how the current 50 percent provincial reduction goal will be achieved if the sum of all of the regional solid waste management initiatives is insufficient. Moreover, is the provincial government goal consistent with our understanding of sustainable development or is there a need to re-examine it in the context of changing societal goals and value systems?

Why is there so much focus on solid waste when the long term viability of our water ecosystems (water quality, natural resources, climate), in terms of management of our liquid wastes, is so crucial to our survival? Should we not at least have a goal rather than some general requirements for municipal liquid waste plans?

4.1.4 <u>Who is Responsible for Waste Management Planning</u>? The general intent of the Waste Management Act, as well as the specific requirement of the MSW Planning Guidelines, is that Waste Management Planning should be undertaken by Regional Districts <u>in their entirety</u>, or by Municipalities where they are not part of Regional Districts.

In the context of sustainable development, however, waste management planning should not be undertaken as a series of discrete, piecemeal activities. For regional

governments to become accountable for managing their wastes, should not planning, supported by appropriate statute and regulation, address all elements of waste comprehensively?

4.1.5 How Do We Pay The Price Which Will Be Demanded? There is no question that we will all, as consumers and as generators of waste, pay both for the mess that we are in and for new ways of managing wastes in the future - we are all accountable. The issue is, how?

Setting aside the purely political question of establishing priorities for spending money, both within and outside the sphere of waste management, the argument then becomes one of which mechanism to use.

There are three groups or classes of mechanism which seem to be appropriate:

Fee Structures
Product Pricing
Taxation

Fees are generally associated with the provision of services. The City of Seattle, for example, has been using volume-based garbage rates predicated on the number and size of cans used by each household. While the principal objective is source reduction (the disincentive approach), the householder maintains freedom of choice to either reduce his waste output or pay for the convenience of continuing with traditional practices.

A similar approach is to be found in many European countries in dealing with liquid wastes. In (West) Germany, for example, charges for effluent disposal are pro-rated according to individual household consumption of water and are added to the water bill.

A third component of this class is the deposit system. While it is arguable that this is not a "fee", it does retain the class characteristics of individual choice and payment for convenience. Expansion of the deposit system beyond its present limited application is not only desirable but necessary. Realistic charges, standardization of product packaging by industry, and refunds on soft drink and fruit juice containers being applied at the manufacturer's level, are high priorities.

In summary, this class of mechanisms is, by virtue of its freedom of choice element, the least reliable in terms of revenue generation and more attractive in terms of inducing behavioural change.

Product pricing as a mechanism envisages the inclusion of all costs, from cradle to grave, in the price of a product. As such, it offers a potential alternative to previously discussed methods of generating revenues if it can be applied uniformly and consistently. It is based on the assumption that higher costs will be attached to those products that are difficult to re use or can only be landfilled and therefore would also function as an incentive/disincentive mechanism. Uniformity of application might reduce the element of free choice associated with the previous class of options. The question arises, however, as to how to assess and apply the post-consumer cost component - disposal/re-use/recycle. Given that the real costs will vary widely according to local conditions such as technology, disposal capacity, market opportunities and economics, it would seem that a flat rate would have to be applied for each item. How would it be determined?

Taxation has long been promoted as a mechanism. The notion of an environmental tax has been translated into reality with the recently introduced provincial taxes on disposable diapers, tires and lead acid batteries. The concept is to add, through taxation, a penalty to the production and sale of ecologically harmful, hard to-dispose-of or non-recyclable items or materials. These revenues might then be used to support research and development into alternative products or ecologically safe methods of disposal such as is the case with the provincial Sustainable Environment Fund.

Taxes might be assessed according to a scale of "ecological harm" or disposal cost. A concern that has been raised has to do with how to ensure that revenues collected by government through such taxes are indeed used to support environmental initiatives.

In summary, the success of the revenue-generating mechanisms examined above is likely to be proportional to the degree of choice given to the consumer. In most cases, there is a duality of purpose associated with many of the options (revenue/value system - behaviour change) which will demand a careful and critical selection process.

4.1.6 Where Are the Standards? Standards are based on units of measurement which in turn are used to develop rules about the quantity and quality of wastes that can be discharged to the environment. As a quantity, a standard may be expressed in cubic metres per day or feet of soil cover; in terms of quality, as parts per million. Standards serve to limit waste discharges, they become the basis for enforcing the law, and they permit assessment of the health of the natural environment. Standards change over time, generally as a response to increasing knowledge or social preference.

Some of our standards, such as the Pollution Control Objectives for Municipal Type Waste Discharges, have not changed since 1975. Others, relating to water quality in rivers and standing bodies of water, have never been addressed in a comprehensive manner. Landfills may contaminate groundwater - what standards do we have to safeguard this important source of water? Without adequate standards, how can we ensure a quality environment or measure our progress towards achieving our sustainable development goals?

A review of landfill and municipal solid waste incinerator objectives is under way by the provincial government and the final reports should be completed within the next six months.

4.1.7 Sharing the Accountability. In its recent Solid Waste Management initiative, the provincial government has stressed the need for "partnership in action". On every hand, we hear about cooperation, working together to achieve success, that we are all responsible for the (state of the) environment. What does it mean?

Currently, we lack a good working definition and yet this is one of the fundamental principles that we must have. It demands that all of the partners in our new initiative understand and agree as to what their respective roles are and do not undertake activities which threaten or undermine those roles. The provincial government is addressing portions of this issue through their policy of recognizing the rights of existing stakeholders in various new waste management initiatives. Local governments seem less sure of their position and might benefit from a more open dialogue with the other "partners". Non-profit organizations are the traditional cornerstone of the grass roots recycling/conservation community, often bridging the gap between the individual and government. The retail

industry seems to be intent on defining its role in contributing to solid waste reduction. What seems to be missing is an overall framework within which all of the partners can work in an efficient and effective manner. Should the Round Table on Environment and Economy provide the opportunity to develop such a framework?

4.2 Solid Waste Issues.

Solid Waste Issues are specific examples of how our inability to deal with the broader, fundamental challenges has impacted on the solid waste sector.

4.2.1 The Real Cost of Landfilling. One of the traditional barriers to recycling and reuse in many communities has been the tendency to underprice landfill costs. As a result, there has been little incentive to look seriously at alternatives. A recent study for the provincial Ministry of Environment has suggested (Gartner Lee, 1990) that average unit costs per tonne will amount to between $29 and $33 over the lifetime of a landfill.

The report also recommends economies of scale and lifespan through regionalization of landfills receiving large quantities of waste over a period of fifteen or twenty years. Given that the costs may serve to encourage initiatives in the 3 R's, the question may arise as to the role that regional landfills should serve in the future.

4.2.2 Product Quality and Packaging. It is not sufficient simply to reduce the amount of packaging, attention must also be given to the types of materials used in packaging to make them either re-usable or recyclable. In addition, legislation should create standards for the percentages of recycled materials that must be included in any new product. Industry must be encouraged to pursue more research into alternative products which are ecologically safe. This, in turn, should be supported by a comprehensive product certification program which bestows a seal of approval on such products.

4.2.3 Transportation Barriers in Rural Communities. Another of the effective barriers to recycling initiatives in rural communities is the prohibitive costs of transporting the recycled materials to markets. Regional Districts facing this particular

problem should consider pooling their resources to create broad regional collection and transportation facilities offering economies of scale.

4.2.4 Organic Wastes. Yard wastes, food wastes and other organics often form the largest single category of materials by weight that finish up in the landfill. In a detailed analysis of their waste stream, the City of Seattle's Solid Waste Utility showed that, prior to the start up of new recycling programs, these organic wastes amounted to 31.1% (160,00 tonnes) of the total solid wastes disposed of in 1987.

While back yard composting should be encouraged through suitable educational programs, trends in housing towards multi-family units often preclude such opportunities. The City of Seattle has undertaken numerous composting initiatives ranging from projects in public "allotment" gardens, to community education, to private sector operated large-scale composting facilities employing windrow processes. Under this latter arrangement, yard waste is banned from the regular garbage pick-up and is picked up separately for a low monthly charge.

The attractive feature of composting programs is that they can and should be carried out at all levels - individual households, communities, municipalities and regional districts.

4.2.5 Problem Wastes. By definition, these are a class of wastes which present unusual problems in terms of conventional disposal. They include such things as demolition wastes, animal carcasses, vehicle hulks, white goods, consumer electronics, and pesticide and herbicide containers (MSW Planning Guidelines, 1990). As such, they have not been well-defined, indeed the "Definitions" Section of the MSW Planning Guidelines does not include this class of wastes.

Until a better definition is established, there will continue to be confusion and ambiguity. One grey area is that between problem wastes and special wastes, particularly in dealing with special waste containers. Better definition in itself, however, is not the solution. The objective must be to apply the 5 R's to this group of wastes in the same way as they are applied to more conventional materials. Problem wastes are so called because we have not yet learned how to deal with them.

4.3 Liquid Waste Issues

Liquid Waste Issues reflect both our inability to deal with the broader challenges and our seeming preoccupation with solid waste.

4.3.1 Liquid Waste Management Planning. Unlike Solid Wastes and Biomedical Wastes, Liquid Wastes have no Planning Guidelines, no target dates for achieving any objectives, and no mandatory regional focus. As noted earlier, the long term sustainability of water-based ecosystems seems to give rise to little concern on the part of governments. Discharges continue to be permitted on a piecemeal basis while ignoring the fact that the environment does not conform to administrative or political boundaries.

Conflicts tend to arise over components of water-based ecosystems - the question of substances that are deleterious to fish; the steadily increasing numbers and sizes of shellfish harvesting closures due to sewage pollution; the disagreement between senior governments over the Initial Dilution Zone principle.

There seems to be no reason why a process similar to the MSW Planning Guidelines, complete with objectives, principles and standards should not be established so that we do not ignore the health of a vitally important ecosystem.

4.3.2 Toxic Contaminants. The contamination of our rivers, lakes, groundwater and seas by a broad range of toxic substances is a serious problem. Leachate from landfills, household hazardous wastes, illegal dumping and discharges to storm drains in urban environments, polycyclic aromatic hydrocarbons from automobile exhausts - these are but a few of the sources of toxins that contaminate our wells, our beaches and introduce carcinogens into the food chain.

It is a complex issue which transcends the traditional solid/liquid waste boundary and it is an issue for which solutions can be found through regulation, education, use of alternative products, and treatment. What is lacking here is the overall framework within which the issue can be properly addressed.

4.3.3 The Three R's Policy. Without a formal framework for dealing with liquid wastes, the opportunities for reduction and recycling within the liquid waste stream are largely fortuitous and are generally the results of far-sighted local initiatives.

Reductions in water use are not only achievable but, in the long term, necessary. How long will we be able to use our drinking water supplies as the medium for liquid waste disposal?

The recycling of the solids in the form of sludge has many potentially beneficial applications - as a fertilizer, as the means of restoring soil structure, as compost. Composting of sewage sludge is another example of the interface of solid and liquid wastes in that the bulking agent for the composting process can be supplied from the solid waste stream. An excellent summary of composting technology was published recently by the Capital Regional District.

The recycling of liquids (waste water) creates an opportunity to supply both water and nutrients through spray or trickle irrigation to forage crops, grasses, golf courses and other applications where potable water supplies are at a premium. While it can rarely be regarded as a sole means of waste water disposal, and while proper treatment is required to safeguard human health, waste water recycling nevertheless must be given consideration in the long term management of water supplies.

5. CONCLUSION

Each broad waste management issue which is of concern to society at large finds its expression as a series of specific issues grouped into solid or liquid waste. Each specific issue will often be further divided into its constituent parts according to public interests, beliefs and value systems. This paper has attempted to create a basis for public debate by selecting only the broad issues and highlighting examples in the solid and liquid waste areas. Public discussion will undoubtedly identify many other issues, and that is as it should be.

I will finish, as I started, with a quotation. "More subtle, but perhaps even more important than the appreciation of approaching direct physical constraints (energy, materials, pollution) are two other levels of perception that have been developing. One is a sense of human beings as biological creatures, immersed in vital ecological relationships within the earth's biosphere. We do not yet understand many of these relationships...Some of our interventions may be going far too fast, and setting in train deleterious changes that cannot be reversed. This perception suggests that we proceed with greater respect for the earth as an ecological system of finite capacity...There is a growing feeling that we must temper some of our "bulldozer" enthusiasms while we devote much more effort to improving our scientific understanding of living ecosystems. We can then better foresee the consequences of what we do, the impacts of which can be global in scale."(Science Council of Canada, 1977).

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APPENDIX A

STATUS OF REGIONAL DISTRICT WASTE MANAGEMENT PLANNING

JULY 1, 1990

Status of Regional District Waste Management Planning

July 1, 1990

Solid Waste

PLANNING ACTIVITY SUMMARY

None	In Progress	Under Revision	Existing
14	12	1	2

VANCOUVER ISLAND

Alberni-Clayoquot

No plan, no activity. MOE hopes to meet with the Regional District in September-October 1990 to initiate some discussions.

Capital Region

Plan completed but now under revision. Mr. Doug Mackay appointed to address landfill problems. Blue box recycling program well established.

Comox-Strathcona

No plan, no activity. MOE hopes to meet with the Regional District in September-October 1990 to initiate some discussions.

Cowichan Valley

Waste Management planning has been under way for about a year and Stage 1 is almost complete.

Mount Waddington

No plan, no activity. The Regional District is refusing to acknowledge that a Waste Management Plan is necessary.

Nanaimo

Have a solid waste management plan in place which was approved in 1988. No revisions currently under way.

LOWER MAINLAND

Central Fraser Valley

Had previously submitted a Stage 1 Report only. Is now included in the Greater Vancouver Regional District's landfill at Cache Creek. Operates transfer stations only.

Dewdney-Alouette

Had previously submitted a Stage 1 report only. No plan and no activity. Maple Ridge municipality is transferring solid waste to Cache Creek.

Fraser-Cheam

No plan and no activity. Municipality of Hope has submitted a Plan for approval. It is about to be approved.

Greater Vancouver

Plan was approved in 1986. No immediate revisions are being contemplated. CHECK WITH G.V.R.D. ON THIS.

Powell River

Have been working on Stage 1 for several years. The process became bogged down at the political level. Some indication that the planning process may be revived - consultant has been retained.

Squamish-Lillooet

No plan and no activity. Have so far refused to accept the need for a plan. Minister's Order pending over the Darcy Landfill site.

Sunshine Coast

No plan and no activity.

SOUTHERN INTERIOR

Central Okanagan

Stage 1 in progress. No public consultation as yet.

Columbia-Shuswap

Stage 1 in progress. Have spent about 18 months on the plan preparation so far.

North Okanagan

Have been trying to put together a plan for about 5 years but has been derailed by jurisdictional conflicts within the regional district. Major problem is inability to find a suitable disposal site.

Okanagan-Similkameen

No plan and no activity although some discussions have taken place between Waste Management and the regional district.

Squamish-Lillooet

Shared with the Lower Mainland Region - see comments above.

Thompson-Nicola

Terms of Reference developed. Call for proposals issued. Stage 1 planning process is expected to get under way in September 1990.

KOOTENAY

Central Kootenay

In the process of completing Terms of Reference for the preparation of a Solid Waste Management Plan.

Columbia-Shuswap

Shared with the Southern Interior Region. Responsibility for the Revelstoke-Golden area - see comments above.

East Kootenay

Still working on the Terms of Reference for a Solid Waste Management Plan.

Kootenay-Boundary

Refuse plan originally approved for the Rossland-Trail-Fruitvale area. Planning has now been reactivated and work is progressing on Stage 1.

SKEENA

Bulkley-Nechako

The Regional Board initiated meetings throughout the communities to find out about public concerns. A report is being prepared as the basis for entering the waste management planning process.

Kitimat-Stikine

No plan and nothing initiated.

Skeena-Queen Charlotte

No plan and nothing initiated. To date, a refusal by the Regional District to accept that they are responsible for the development of a plan.

NORTHERN REGION

Bulkley-Nechako

See comments for the Skeena Region above.

Cariboo

Regional District has recently passed a resolution to initiate the solid waste management planning process.

Central Coast

Solid waste management planning process has just been initiated.

Fort Nelson-Liard

Recent discussions with the Regional District indicate that they are aware of the requirements for solid waste management planning but there has been no activity as yet.

Fraser-Fort George

Solid waste management planning process has been intiated. A Technical Steering Committee has been formed and Terms of Reference developed for approval by the Regional Board. Will shortly be looking for funding.

Peace River

Solid waste management planning process initiated. Public concerns have been sought and a Technical Steering Committee has been formed. Draft Terms of Reference are expected to be finalized by mid-July and calls for proposals will be forthcoming.

Status of Regional District Waste Management Planning

July 1, 1990

Liquid Waste

PLANNING ACTIVITY SUMMARY

None	In Progress	Under Revision	Existing
23	3	-	3**

**Numerous plans in Okanagan Valley but not at RD level.

VANCOUVER ISLAND

Alberni-Clayuquot

No plan, no activity.

Capital Region

Stage 1 completed March 1990 and reviewed by the Environment Committee. Recommendations submitted to the Regional Board on July 4, 1990.

Comox-Strathcona

No plan, no activity.

Cowichan Valley

Waste Management planning is in the discussion stage only.

Mount Waddington

No plan, no activity.

Nanaimo

No plan and no activity.

LOWER MAINLAND

Central Fraser Valley

No plan and no activity.

Dewdney-Alouette

No plan and no activity.

Fraser-Cheam

No plan and no activity.

Greater Vancouver

Stage 1 Liquid Waste plan completed and approved subject to certain conditions. Stage 2 is anticipated.

Powell River

No plan and no activity.

Squamish-Lillooet

No plan and no activity. Municipality of Whistler is developing a liquid waste plan.

Sunshine Coast

Have submitted a Stage 1 liquid waste plan for the Gibsons area. A plan is also under way for Sechelt.

SOUTHERN INTERIOR

Central Okanagan**

See note below.

Columbia-Shuswap

No plan and no activity.

North Okanagan**

See note below.

Okanagan-Similkameen**

See note below.

** Liquid waste management planning has been underway for about 5 years in the Okanagan valley but not at the regional district level. Plans have been completed for the urban areas such as Osoyoos, Penticton, Kelowna, Vernon and Armstrong. Plans have also been completed for all Electoral Areas. Planning is under way for municipalities such as Summerland, Peachland, Coldstream and Spallumcheen. The planning process was funded to 75% of costs.

Squamish-Lillooet

Shared with the Lower Mainland Region - see comments above.

Thompson-Nicola

No plan and no activity.

KOOTENAY

Central Kootenay

No plan and no activity.

Columbia-Shuswap

Shared with the Southern Interior Region. Responsibility for the Revelstoke-Golden area - see comments above.

East Kootenay

No plan and no activity.

Kootenay-Boundary

No plan and no activity.

SKEENA

Bulkley-Nechako

No plan and no activity.

Kitimat-Stikine

No plan and nothing initiated.

Skeena-Queen Charlotte

No plan and nothing initiated.

NORTHERN REGION

Bulkley-Nechako

See comments for the Skeena Region above.

Cariboo

No plan and no activity.

Central Coast

No plan and no activity.

Fort Nelson-Liard

No plan and no activity.

Fraser-Fort George

No plan and no activity.

Peace River

Liquid Waste plan approved for Charlie Lake but no plan or activity at the regional district level.